

What Is Claimed Is:

1. Non-contacting conveyance equipment comprising:
a concave opening having a continuous walled inner peripheral surface;
an end face that opposes the object to be conveyed, the end face being formed in the concave opening; and
a fluid passageway comprising a spout facing the inside of the concave opening, to supply fluid to the inner peripheral surface of the concave opening so as to cause a swirl of fluid within the concave opening.
2. Non-contacting conveyance equipment according to claim 1, wherein the concave opening has a polygonal inner peripheral surface.
3. Non-contacting conveyance equipment according to claim 1, wherein the spout is approximately tangential to the inner peripheral surface.
4. Non-contacting conveyance equipment according to claim 1, wherein a plurality of spouts face the inside of the concave opening such that the plurality of spouts together cause the swirl of fluid within the concave opening.
5. Non-contacting conveyance equipment according to claim 1, further comprising a centering guide to maintain the object to be conveyed such that the object opposes the end face.
6. Non-contacting conveyance equipment according to claim 5, wherein the non-contacting conveyance equipment has an outer periphery, and the centering guide comprises at least three centering protrusions provided around the outer periphery.
7. Non-contacting conveyance equipment according to claim 6, wherein the centering protrusions are radially displaced from a center of the non-contacting conveyance equipment, and
the non-contacting conveyance equipment further comprises a centering mechanism to vary the radial distance of the centering protrusions from the center of the non-contacting

conveyance equipment.

8. Non-contacting conveyance equipment according to claim 7, wherein the centering mechanism comprises:

a rotatable disk; and

arms linking each centering protrusion to the rotatable disk such that rotation of the rotatable disk changes the radial distance of the centering protrusions from the center of the non-contacting conveyance equipment.

9. Non-contacting conveyance equipment according to claim 8, wherein the centering mechanism is pneumatically driven.

10. Non-contacting conveyance equipment according to claim 1, further comprising a base with a plurality of concave openings are provided on the base, each concave opening having an end face formed therein and a fluid passageway comprising a spout facing the inside thereof.

11. Non-contacting conveyance equipment according to claim 10, wherein the spouts of the concave openings face different directions such that fluid swirls in a clockwise direction in a first portion of the concave openings and fluid flows in a counter clockwise direction in a second portion of the concave openings.

12. Non-contacting conveyance equipment according to claim 10, wherein the base is surrounded with a peripheral edge to block a flow of fluid off the base.

13. Non-contacting conveyance equipment according to claim 12, wherein the peripheral edge has a stepped shape.

14. Non-contacting conveyance equipment according to claim 10, further comprising at least one fluid discharge passage provided in the base to eliminate fluid supplied through the spouts.

15. Non-contacting conveyance equipment, comprising:
a base having a center;

a center swirl formation object formed substantially at the center of a base, the center swirl formation object comprising:

a concave opening having a continuous walled inner peripheral surface;

an end face that opposes the object conveyed, the end face being formed in the concave opening; and

a fluid passageway comprising a spout facing the inside of the concave opening, to supply fluid to the inner peripheral surface of the concave opening so as to cause a swirl of fluid within the concave opening;

a plurality of fluid swirl formation objects arranged around the center swirl formation object, each of the fluid swirl formation object comprising:

a concave opening having a continuous walled inner peripheral surface;

an end face that opposes the object conveyed, the end face being formed in the concave opening; and

a fluid passageway comprising a spout facing the inside of the concave opening, to supply fluid to the inner peripheral surface of the concave opening so as to cause a swirl of fluid within the concave opening.

16. Non-contacting conveyance equipment according to claim 15, wherein an inner wall is formed within the concave opening of the center swirl formation object so as to form a channel between an outer surface of the inner wall and the inner peripheral surface of the concave opening.

17. Non-contacting conveyance equipment according to claim 1, further comprising an ionization device to ionize the fluid supplied through the spout.

18. Non-contacting conveyance equipment according to claim 17, wherein the fluid is air, which is vibrated with an ultrasonic frequency.

19. Non-contacting conveyance equipment according to claim 1, wherein the fluid is air, which is vibrated with an ultrasonic frequency.

20. Non-contacting conveyance equipment according to claim 17, wherein the ionization device comprises an ion source located within the concave opening.

21. Non-contacting conveyance equipment according to claim 1, wherein a plurality of concave openings are provided on a base, each concave opening having an end face formed therein and a fluid passageway comprising a spout facing the inside thereof, and

the device further comprise an ion source located on the base, outside of the concave openings.

22. A wafer conveyance device comprising:

a base;

at least two arms extending from the base; and

at least one fluid swirl formation object formed in each arm, each fluid swirl formation object comprising:

a concave opening having a continuous walled inner peripheral surface;

an end face which opposes the wafer to be conveyed, the end face being formed in the concave opening; and

a fluid passageway comprising a spout facing the inside of the concave opening, to supply fluid to the inner peripheral surface of the concave opening so as to cause a swirl of fluid within the concave opening.

23. A wafer conveyance device, comprising:

a pair of guide arms; and

a fluid swirl formation object formed between the pair of guide arms, the fluid swirl formation object comprising:

a concave opening having a continuous walled inner a peripheral surface;

an end face that opposes the wafer to be conveyed, the end face being formed in the concave opening; and

a fluid passageway comprising a spout facing the inside of the concave opening, to supply fluid to the inner peripheral surface of the concave opening so as to cause a swirl of fluid within the concave opening.

24. A wafer conveyance device according to claim 23, wherein

one of the guide arms pivots and is biased towards the wafer, but is manually movable away from the wafer, and

an open and close switch is connected to the fluid passageway of the fluid swirl

formation object to interrupt the supply of fluid to the inner peripheral surface.